Antibacterial Efficacy from NO-Releasing MOF-Polymer Films

Morven J Duncan[1], Paul S Wheatley[1], Emma M Coghill[2], Simon M Vornholt[1], Stewart J Warrender[1]*, Ian L Megson[2], Russell E Morris[1]

[1] School of Chemistry, University of St Andrews, North Haugh, St Andrews KY16 9ST, UK.

[2] Free Radical Research Facility, Division of Biomedical Sciences, University of the Highlands & Islands, Inverness, IV2 3JH, UK.

Supporting Information
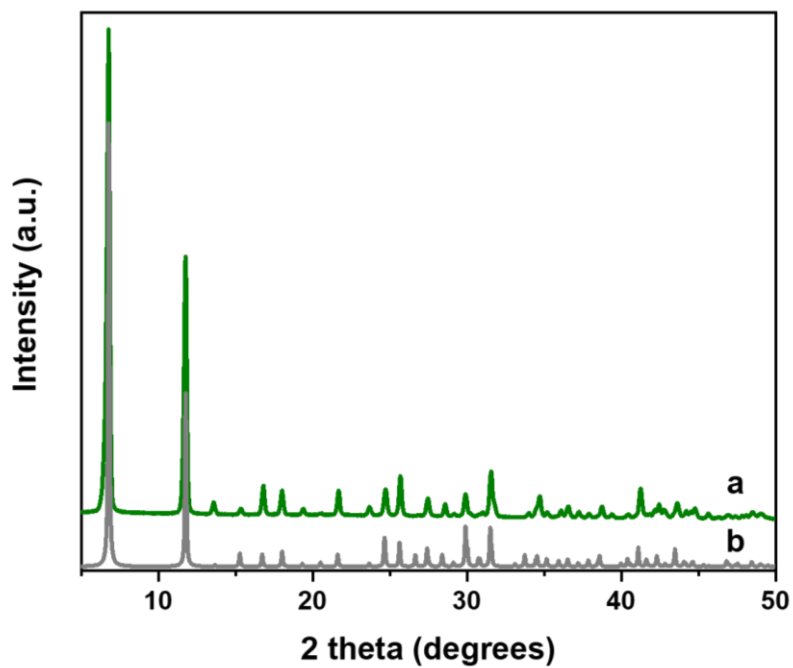
Contents

Figure S1: Powder XRD of as-prepared CPO-27 (Ni) (a), compared to the theoretical pattern for the same material (b).

Figure S2: TGA profile of as-prepared CPO-27 (Ni) powder.

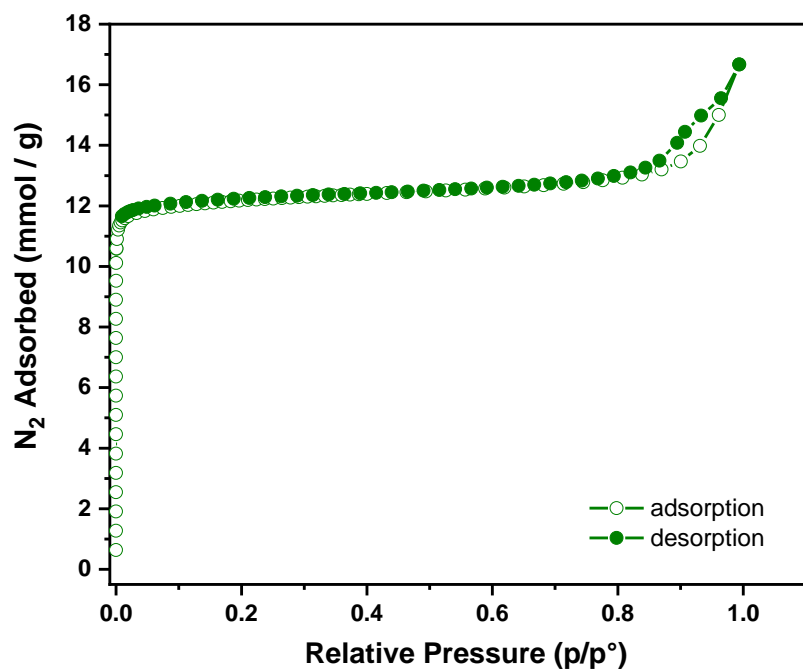**Figure S3**: Nitrogen adsorption/desorption isotherms for as-prepared CPO-27 (Ni) powder.
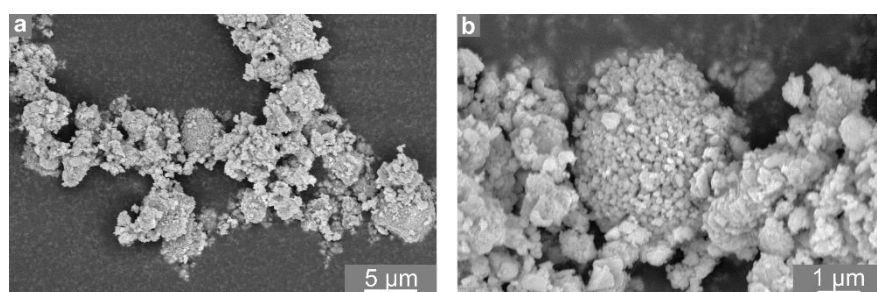

Figure S4: SEM images of as-prepared CPO-27 (Ni) powder.
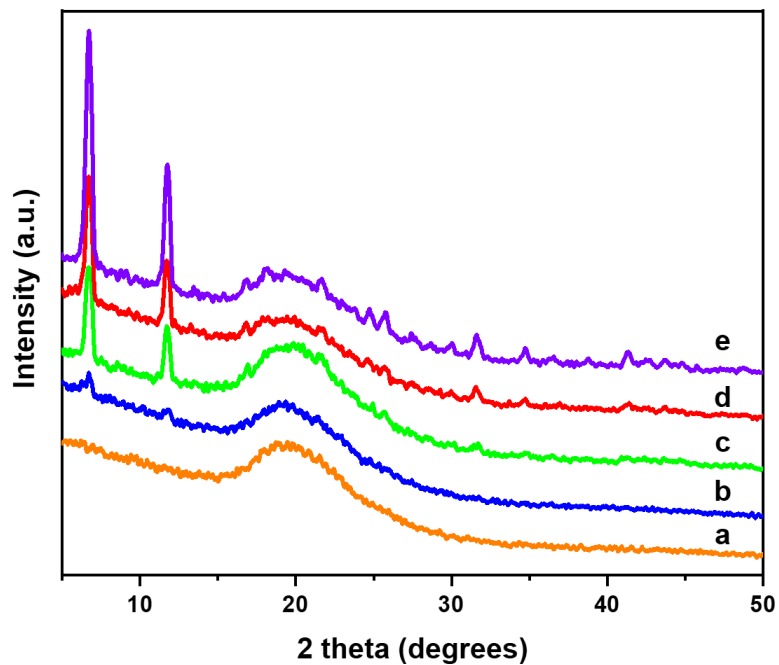
Figure S5: X-ray diffraction patterns for polyurethane films containing 0 wt% (a), 1 wt% (b), 5 wt% (c), 10 wt% (d) and 15 wt% (e) CPO-27 (Ni).

Figure S6: Photograph of as-prepared, stand-alone CPO-27 (Ni)-containing polyurethane film.

Table S1: Numerical data from NO adsorption, storage and release analyses of films containing 1 wt%, 5 wt%, 10 wt% and 15 wt% CPO-27 (Ni).

CPO-27 (Ni) Loading (wt%)	NO Adsorbed	NO Stored	Total NO Released	NO Adsorbed	NO Stored	Total NO Released
	(mmol NO per g film)			(mmol NO per g MOF)		
1	0.03	0.03	0.01	3.29	2.98	1.04
5	0.16	0.16	0.08	3.24	3.13	1.62
10	0.31	0.30	0.29	3.10	2.98	2.94
15	0.54	0.53	0.49	3.61	3.53	3.30

Table S2: Numerical data from antibacterial assay against *E. coli*. Mean colony forming units (N) and associated standard deviations (s.d.) were calculated from six replicate experiments.

	Hours contact	Mean N value (bacteria cfu/cm^2)	N value s.d. (bacteria cfu/cm^2)	Log $_{10}$ N	Log reduction (R)
CONTROL	0	36354.17	2762.28	4.56	-
	1	27583.33	6984.83	4.44	0.12
	5	6395.83	3977.86	3.81	0.75
1.0% NO	0	43916.67	3459.72	4.64	-
	1	20479.17	6803.62	4.31	0.33
	5	<2.5	0	<0.40	>4.24
CONTROL	0	36354.17	2762.28	4.56	-
	1	27583.33	6984.83	4.44	0.12
	5	6395.83	3977.86	3.81	0.75
5.0% NO	0	31875	4382.95	4.5	-
	1	<2.5	0	<0.40	>4.11
	5	<2.5	0	<0.40	>4.11
CONTROL	0	42729.17	2294.9	4.63	-
	1	31645.83	3962.12	4.50	0.13
	5	12708.33	4222.28	4.10	0.53
10.0% NO	0	42500	3493.5	4.63	-
	1	<2.5	0	<0.40	4.23
	5	<2.5	0	<0.40	4.23
CONTROL	0	36416.67	4047.07	4.56	-
	1	20645.83	10670.93	4.31	0.25
	5	272.92	3336.20	2.44	2.13
15.0% NO	0	40437.5	5655.98	4.61	-
	1	<2.5	0	<0.40	>4.21
	5	<2.5	0	<0.40	>4.21

Table S3: Numerical data from antibacterial assay against *S. aureus*. Mean colony forming units (N) and associated standard deviations (s.d.) were calculated from six replicate experiments.

	Hours Contact	Mean N value (bacteria cfu/cm^2)	N value s.d. (bacteria cfu/cm^2)	Log $_{10}$ N	Log reduction (R)
CONTROL	0	31541.67	2681.66	4.5	-
	1	24000.00	5828.03	4.38	0.12
	5	1477.08	22675.69	3.17	1.33
1.0% NO	0	29479.17	5061.51	4.47	-
	1	12791.67	3989.81	4.11	0.36
	5	<2.5	0	<0.40	>4.07
CONTROL	0	31541.67	2681.66	4.5	-
	1	24000.00	5828.03	4.38	0.12
	5	1477.08	22675.69	3.17	1.33
5.0% NO	0	29895.83	1929.02	4.48	-
	1	49.79	110.55	1.7	2.78
	5	<2.5	0	<0.40	>4.08
CONTROL	0	11854.17	3154.11	4.07	-
	1	7895.83	1057.75	3.90	0.18
	5	8.54	9.74	0.93	3.14
10.0% NO	0	12604.17	1794.75	4.1	-
	1	<2.5	0	<0.40	>3.70
	5	<2.5	0	<0.40	>3.70
CONTROL	0	33541.67	2999.68	4.53	-
	1	16041.67	5680.74	4.21	0.32
	5	4252.08	5664.01	3.63	0.90
15.0% NO	0	29083.33	1816.38	4.46	-
	1	<2.5	0	<0.40	>4.07
	5	<2.5	0	<0.40	>4.07